

### **REMARKS/ARGUMENTS**

Applicant has carefully reviewed and considered the Final Office Action mailed on February 6, 2006, and the references cited therewith.

Claims 1, 13, and 18 are amended, claim 9 is canceled, and no claims are added; as a result, claims 1-8 and 10-29 are now pending in this application.

#### **§ 103 Rejection of the Claims**

Claims 1-8 and 10-29 were rejected under 35 USC § 103(a) as being unpatentable over Notargiacomo et al (U.S. Patent No. 6,879,422) in view of Hui et al (U.S. Patent No. 6,438,148). Applicant traverses the rejection for the following reasons.

The rejection states in part that “Notargiacomo et al ‘422. . .does not specifically disclose that the modulator is an electroabsorption modulator.” However, the Examiner asserts that “Hui et al ‘148 teaches of using an electroabsorption modulator in a feedback system to encode information onto an optical beam . . . for the purpose of providing a modulator to match the required speed of the operation.” From Applicant’s review of the Notargiacomo and Hui references, neither reference, either independently or in combination teaches or suggests adjusting the electrical input signal of an electroabsorption modulator based on a measured harmonic value. In contrast, Applicant’s independent claim 1, as amended, recites in part:

upon detection of the harmonic value, adjusting the electrical input signal provided to the EAM based upon the measured harmonic value

Applicant’s independent claim 7 recites, in part:

adjusting an electrical input to the EAM to equal the optimum electrical signal value

Applicant’s independent claim 13, as amended, recites in part:

upon detection of the harmonic value, adjusting the electrical input signal provided to the EAM based upon the measured harmonic value

Finally, Applicant’s independent claim 18, as amended, recites, in part:

a monitoring component configured to measure a harmonic value in the encoded optical beam and to calculate an adjustment in the electrical input signal, to be applied to the EAM so as to reduce the measured harmonic value

There is no reference to adjusting the electrical input signal of an EAM to reduce a measured harmonic value anywhere in the Notargiacomo reference, which appears to describe a method for reducing a background noise in electro optical modulators. (Column 4, lines 42-45). At Column 1, lines 9-10, Notargiacomo specifically states, "The present invention relates to electro-optical modulators." As such, each and every element of independent claims 1, 7, 13, and 18 is not taught or suggested in the Notargiacomo reference.

The Hui reference does not cure the deficiencies of the Notargiacomo reference. With respect to claims 1, 7, 13, and 18, the Examiner contends that the Hui et al. reference (hereinafter "Hui") teaches:

using an electroabsorption modulator in a feedback system to encode information onto an optical beam (Column 4, line 22-Column 5, line 35 and Column 8, lines 43-51, wherein the electroabsorption modulator "34" encodes information onto the optical beam and feedback system "44" controls the electrical input "56" into the modulator, Figure 1), for the purpose of providing a modulator to match the required speed of the operation (Column 8, lines 43-51).

The feedback system disclosed in the Hui reference is not used to adjust the electrical input of the electroabsorptive modulator, as provided in Applicant's independent claims 1, 7, 13, and 18. Specifically, Figure 1 of Hui shows the input to the modulator 35 as being an optical input from laser 30, and not as being an electrical input to the modulator as recited in Applicant's independent claims 1, 7, 13, and 18. (Column 7, lines 37-39).

As shown in Figure 1 of Hui, the feedback signal 56 does not control the electrical input of the modulator 35. Rather, the feedback signal 56 appears to control an input of the laser 30 in order to produce a phase shift of the laser, and is not used to adjust the electrical input of the modulator, as recited in Applicant's independent claims 1, 7, 13, and 18.

In looking at the Hui reference to support this reasoning, the reference appears to describe a method for encoding data into a high speed optical train by providing phase shifts between “N” short pulse optical trains of frequency “f” to form a combined optical pulse train having a frequency of “Nf.” (Column 1, lines 57-67). At Column 5, lines 21-25, the Hui reference states “The feedback means 44 extracts the information about the current phase alignment between the two branches and generates a feedback signal 56 sent to the variable delay line 42, . . . to adjust the phase shift of the lasers. . . .”

Furthermore, Applicant submits that Hui does not teach or suggest an electroabsorption modulator as recited in each of independent claims 1, 7, 13, and 18. The Examiner cites Column 8, lines 43-51 as disclosing an electroabsorption modulator.

However, in the cited quote, Hui misuses the term electroabsorptive, which is the only time it is used in the Hui reference. Specifically, Column 8, lines 46-51 recite “The encoding means 24 and 34 may include electro-optical modulators or other known types of modulators providing the required speed of operation. Preferably the modulators are electro-absorptive, LiNbO<sub>3</sub> or III-V semiconductor material based devices, either Mach-Zehnder or travelling wave type.”

In other words, the referral to “electro-absorptive” is in reference to Mach-Zehnder or travelling wave modulators, which are electro-optic modulators, not electroabsorptive modulators and therefore was made in an erroneous manner. Moreover, all other references to modulators used in the Hui reference are to electro-optic modulators.

As such, each and every element of independent claims 1, 7, 13, and 18, is not taught or suggested in the Notargiacomo and Hui references, either independently or in combination. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the § 103 rejection for the above independent claims 1, 7, 13 and 18, as well as those claims which depend therefrom.

The Examiner contends that it would have been obvious for the electro optic modulator of Notargiacomo to further be an electroabsorption modulator since Hui teaches of using an electroabsorption modulator in a feedback system to encode information onto an optical beam, for the purpose of providing a modulator to match

the required speed of the operation. (Office Action, page 3, paragraph 1). Applicant respectfully disagrees and submits that the Examiner has not established that there is a suggestion or motivation to combine the Notargiacomo and Hui references.

For the reasons stated above, the Hui reference does not teach or suggest an electroabsorptive modulator. However, even if the Examiner believes Hui does teach an electroabsorptive modulator, there is not a motivation or suggestion to combine an electroabsorptive modulator in a feedback system of the Hui reference with the electro optical modulator in a feedback system of the Notargiacomo reference.

As stated above, the Hui reference appears to describe a method for adjusting the phase shifts of multiple lasers (e.g., lasers 20 and 30) via a feedback means such that the outputs of multiple encoding means (e.g., modulators 25 and 35) can be combined in order to form an optical pulse train at a higher frequency than that of the optical train from a single modulator (e.g., in order to increase modulation bandwidth). (Column 7, lines 45-52). There is no suggestion to adjust the input signal to the EAM.

Conversely, the Notargiacomo reference appears to describe a method for reducing the background noise associated with the optical output signal of an electro optical modulator in order to improve the stability of the operating point (e.g., operating voltage) of the electro optical modulator. (Column 4, lines 56-61, and Column 8, lines 33-35). And, as discussed above, the Notargiacomo reference specifically states that its "invention relates to electro-optical modulators." Accordingly, since the Notargiacomo and Hui references are using feedback systems for different and distinct purposes, the combination of the feedback system of Hui with the encoding system of Notargiacomo requires impermissible hindsight.

Based on the foregoing, Applicant respectfully submits that the cited references do not support a proper prima facie case of obviousness. Applicant respectfully requests reconsideration and withdrawal of the § 103 rejection to independent claims 1, 7, 13, and 18, as well as those claims which depend therefrom.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 236-0121 to facilitate prosecution of this matter.

**CERTIFICATE UNDER 37 CFR §1.8:** The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS AF Commissioner for Patents, P.O. BOX 1450 Alexandria, VA 22313-1450, on this 6<sup>th</sup> day of April, 2006.

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